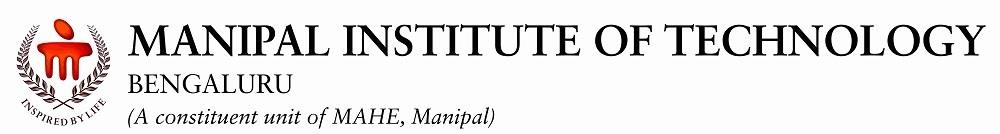
**A**

**PROJECT SYNOPSIS**

**On**

**ECG Signal Acquisition Analysis and Secure Biometric System**

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**INDEX**

**1.PROJECT ABSTRACT…………………4**

**2.INTRODUCTION……………………….4**

**3.LITERATURE REVIEW……………….4**

**4.NEED FOR PROJECT………………….6**

**5.OBJECTIVE……………………………..6**

**6.METHODOLOGY………………………6**

**7.COMPONENTS REQUIRED…………..7**

**8.EXPECTED RESULTS………………….7**

**9.PROJECT SCHEDULE…………………7**

**10.REFERENCES…………………………8**

1. **PROJECT ABSTRACT**

The Real-time ECG Analysis and Acquisition System is a comprehensive project designed to monitor, acquire, and analyze electrocardiogram (ECG) signals in real-time. This system aims to contribute to the field of healthcare by providing a reliable and efficient tool for continuous cardiac monitoring and analysis.

1. **INTRODUCTION**

The rapid advancement of technology in the healthcare domain has paved the way for innovative solutions aimed at enhancing both diagnostic capabilities and accessibility to medical monitoring. Electrocardiography (ECG) remains a cornerstone in cardiovascular health assessment, providing crucial insights into the heart's electrical activity. This project introduces the development of a Real-Time ECG Monitoring System, a versatile and cost-effective solution designed for educational, research, and personal healthcare applications.

1. **LITERATURE REVIEW**

**DATA PREPROCESSING:-**

Wavelet transform denoising is employed, and the choice of the wavelet basis function (bior2.6) is justified based on mean absolute error (MAE) and signal-to-noise ratios. The denoised signals exhibit reduced noise, improving the signal quality for machine learning model training.

[Shila Dhande, LABVIEW BASED ECG SIGNAL ACQUISITION AND ANALYSIS]

**DATA ACQUISITION IN AD8232:-**

Reasearch by [2] Mustafa Zahid, In the abstract “REALTIME FEATURE ACQUISITION BY LABVIEW,”Interms of materials and methods, raw ECG signals were obtained using the AD8232 module, with LabVIEW serving as the software platform. The NI myDAQ card facilitated the conversion of analog signals to digital, and various filtering techniques, including band-pass and band-stop filters, were applied to enhance signal quality [2]. The workflow involved real-time feature extraction of ECG signals using LabVIEW, NI myDAQ, and the AD8232 module.

**ECG-BASED MODELS FOR ARRHYTHMIA DIAGNOSIS:-**

With the evolution of artificial intelligence (AI) techniques, the diagnosis and prognosis of arrhythmia became easier for the physicians and practitioners using only an electrocardiogram (ECG) examination. This review presents a synthesis of the studies conducted in the last 12 years to predict arrhythmia’s occurrence by classifying automatically different heartbeat rhythms. From a variety of research academic databases, 40 studies were selected to analyze, among which 29 of them applied deep learning methods (72.5%), 9 of them addressed the problem with machine learning methods (22.5%), and 2 of them combined both deep learning and machine learning to predict arrhythmia (5%). [Abir Boulif, ECG BASED MODEL FOR ARRYTHMIA DIAGNOSIS]

**ECG FEATURE EXTRACTION:-**

In this paper discusses the comparative study of Electro Cardiogram (ECG) feature extraction for the prediction of ventricular arrhythmia using a unique set of ECG features extraction and classifier algorithm. This ECG feature extraction is one of the important significant roles in diagnosing most of the cardiac diseases. In ECG, P-QRS-T waves provide the one cardiac cycle in heart beat activity. This ECG feature extraction measured the amplitudes and intervals in the ECG signal for subsequent analysis. The amplitudes and intervals value of P-QRS-T segment measuring the working of heart beat in every human. Recently, several research and techniques have been implemented for analyzing the ECG signal. All these techniques and algorithms have their merits and demerits. This paper discusses the various techniques and transformations proposed earlier in literature for extracting feature from an ECG signal.

**A LABVIEW APPROACH FOR DETECTION OF CARDIAC ARRHYTHMIA:-**

Development of medical domain application has been one of the most active research areas as people have showing most of their interests for their health issues. Cardiac arrhythmia is becoming one of the leading causes of cardiovascular disease for men and women. Diagnosis and treatment of these conditions are usually achieved by using electrocardiogram signal (ECG)but detecting of heart diseases by using only ECG has some disadvantages so detecting heart disease by using other resources is better way. In this work LabVIEW based virtual system presented helps in de-noising, feature extraction, detection of heart rate, and automatic ECG abnormalities indicator. The designed system is advantageous for filtration of acquired signal or automatic removal of noise on virtual cardiographs and detection of P wave, QRS complex and T wave and then automatic indicate heart abnormality present in the signal. This designed have been tested on ECG database obtained from physionet.

[Index Terms— ECG, LabVIEW, Biomedical Toolkit, Cardiac Arrhythmia]

**4. NEED FOR PROJECT**

Traditional ECG monitoring systems may lack user-friendly interfaces or real-time analysis capabilities. This project addresses the need for an accessible, efficient, and customizable ECG monitoring system using LabVIEW.

**5. OBJECTIVES**

1. Develop a LabVIEW interface for real-time ECG signal acquisition.
2. Implement signal processing algorithms for noise reduction and feature extraction.
3. Incorporate features for heart rate calculation and anomaly detection.

**6. METHODOLOGY**

**Signal Detection and Processing:-**

Detecting the signals from the lead electrodes and processing them in a breadboard circuit consisting of an instrumentation amplifier, notch filter and a high pass filter.

**Analog to Digital Conversion by myDAQ:-**

Passing the signals after being processed on the circuit through NI myDAQ and LABVIEW.

**Plotting and Analysis using LabView:-**

Building a user friendly interface and a database for the acquired signals in order to get an ECG report .

**7.COMPONENTS REQUIRED**

a) Module AD8232 biomedical sensor.

b) NI myDAQ card.

c) Lead electrode wires.

d) Breadboard.

e) Op-amps and connecting wires.

f) Instrumentational amplifier.

**8. EXPECTED RESULTS**

1.Real-time display of ECG signals in LabVIEW.

2.Accurate heart rate calculation and anomaly detection.

3.Security System allowing info access only to specific users.

**9. PROJECT SCHEDULE**

1. Month 1: System Design and Circuit Implementation

2. Month 2: Integration with myDAQ

3. Month 3: Creating a database and User Interface using

NI Labview

**10. REFERENCES**

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